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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
AMINI, JAVID A	
ART UNIT	**PAPER NUMBER**
2672	

DATE MAILED: 12/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/945,367	HUNTER, KEVIN	
	Examiner	Art Unit	
	Javid A Amini	2672	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11 and 13-36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Claim Objections

Claims 13 and 14 objected to because of the following informalities: they are depended on the cancelled claim 12. Appropriate correction is required.

Response to Arguments

Applicant's arguments filed July 2, 2004 have been fully considered but they are not persuasive.

Applicant on page 9 of remarks lines 6-14 argues the reference Zhu fails to disclose the limitations in claims 1, 10 and 18, because Zhu patent is directed to screen space tiling (SST). Examiner's reply: Zhu's invention as discloses in col. 3 lines 45-60 "it relates to the rendering of graphics in a computer environment. More particularly, it relates to a rendering pipeline system that renders graphical primitives displayed in a computer environment". Also Zhu's invention uses screen space tiling to eliminate the memory bandwidth bottleneck. Examiner refers to col. 16 lines 6-25 and in fig. 8 illustrates a whole pixel and a sub-pixel for the calculation of point P.

Applicant on page 9 lines 14-24 argues the reference fails to disclose shifting a transformed primitive to first and second offsets. Examiner's reply: Zhu in col. 16 lines 15-16 shows the calculation or the shifting (dpdx and dpdy) of two different areas. Examiner's comment: Applicant should explicitly specify the shifting process.

Applicant on page 9 last paragraph argues the reference fails to describe rendering a geometric primitive that has been shifted by an offset in order to generate pixels for a second intermediate image. Examiner's reply: Zhu in col. 11 under non-anti-aliasing shows a table for multi-rendering. Examiner's comment: Applicant should explicitly specify the meaning of sub-pixel offset, and should specify the conditions for the images (static or dynamic).

Applicant on page 10 in second paragraph argues the reference does not address combining the values for the respective pixels. Examiner's reply: Zhu in col. 16 lines 31-35 specifies location of old and new points and combining these points. These points are calculated in respect to the center of each pixel see fig. 8.

Applicant on bottom of page 10 and beginning of page 11 argues the reference fails to disclose issuing geometric primitives of a scene a plurality of times or reissuing geometric primitives for each sampling location of a sampling pattern. Examiner's reply: Zhu in col. 10 lines 25-67 teaches the location of (x, y, z) coordinates in the primitive forms. The reissuing geometric primitives for each sampling location are inherent in the reference. Applicant needs to be more specific in this area, because the reference in fig. 8 illustrates p0, p1 and p2, which have different geometric primitive.

Applicant on page 11, second paragraph argues the reference does not teach claim limitations in claims 24 and 33. Examiner's reply: the new coordinate space that issued by the rendering stage is inherent, because the new information of a plurality of pixels is different according to their locations (x, y and z). The second argument is for a graphics system having a multi-stage processing pipeline. The reference in fig. 4 and in col. 5 lines 45-67 describes in detail the operation in parallel stage.

For the reasons above the pervious rejection mailed on March 26, 2004 is still active.

Claim Rejections - 35 USC § 102

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-11, 13-36 rejected under 35 U.S.C. 102(e) as being anticipated by Zhu.

Re claim 1, Zhu teaches a method for calculating values for pixels of an image of an environment represented by geometric primitives that are defined by geometric data (col. 3, Lines 53-59), the method comprising transforming the geometric primitives from a first coordinate space to a second coordinate space (fig. 13), shifting a transformed primitive by a first sub-pixel offset rendering the shifted primitive to generate values for pixels of a first intermediate image shifting the transformed primitive by a second sub-pixel offset (col. 6. Lines 2-50), rendering the shifted primitive to generate values for pixels of a second intermediate image (col. 34. Line 50 to col. 36, Line 3), and combining the values for the respective pixels of the first and second intermediate images to determine the values for the pixels of the image (col. 5. Lines 45-37). In other words, Zhu teaches geometry processing in graphics applications is preformed using floating-point arithmetic. Since floating-point arithmetic requires much more

hardware to implement than fixed-point arithmetic, they are calculated in fixed-point arithmetic instead. For example, eye-space z's can be calculated as indices to look up fog tables stored as textures. AII polygon attributes (or parameters) can be treated in exactly the same fashion with the exception of screen z's. The above observation validates the idea of pushing for a single super-pipeline for computing per-pixel parameters. If data can be moved fast enough through this super-pipeline without starving the downstream hardware, then there is no need to replicate (nearly) identical hardware units. Furthermore, he teaches a double-z method that decouples pixel shading rate from scan conversion and z-buffer rate. In that a pixel is a unit area of the frame, and a fragment is the intersection of a primitive with a pixel. Assuming that a frame of geometries has been transformed into screen space and buffered, the double-z algorithm relies on a scan/z engine that generates visibility through two passes. The first pass generates the depth information in a depth buffer by scan converting primitives and interpolating/comparing/storing depths per pixel using only screen x, y, z coordinates in the primitive forms such as points, line, triangles, strips/fans. Neither rasterization for other surface parameters nor shading/blending computation is performed. The second pass uses the depth-buffer generated by the previous pass, scan converts primitives using screen x, y, z coordinates again, and outputs fragments with screen depths less than or equal to the depths in the depth buffer. These fragments contain pixel locations and corresponding coverage masks. These fragments correspond to the visible fragments. Further, based on if a primitive generates any visible fragment, the visibility information with respect to entire primitives can also be output.

Re claims 2, 15-17, 19, and 25-26, Zhu discloses writing the values for pixels of the first intermediate image to a first buffer and writing the values for pixels of the second intermediate image to a second buffer (col. 11, Line 63 to col. 12, line 55).

Re claims 3, 20, 27, and 34, Zhu discloses a z-buffer (col. 6. Line 56: 50. 2-element 205). A z-buffer is implemented in the anti-aliasing system of Zhu.

Re claims 4 and 30, Zhu discloses a strip of connected triangles (figs. 5-elements 501 and 505).

Re claims 5 and 31, Zhu discloses a fan shaped set of connected triangles (col. 1, Lines 29-31; fin. 1). In figure 1, element 103 illustrates a fan shaped set of connected triangles.

Re claims 6 and 32, Zhu discloses a set of disjoint triangles (col. 2. Lines 48-50: figs. 3. 10 and l-elements 101 and 102). Zhu discloses disjoint triangles

Re claims 7, 11-10, and 23, Zhu discloses shifting the transformed primitive by the first sub-pixel offset comprises shifting the transformed primitive to a sub-pixel Location corresponding to a first sampling Location of a sampling pattern (fin. 13). In figure 13, Zhu discloses geometry processing is substantially limited to geometry transformation, normal transformation, texture coordinate generation and transformation.

Re claims 8, 13, 21, 28, and 35, Zhu discloses averaging the values for the respective pixels from the first and second intermediate images (col. 6. lines 35-50: col. 28. Lines 1-24). In other words, Zhu discloses the bandwidth goes down when the average vertex size decreases. In addition, the bandwidth number goes down as the average triangle size becomes smaller, because a tile can now contain Longer strips, and the Likelihood of triangle duplication in multiple tiles due to tile border crossing is reduced. The asymptotic rate approaches 40.about.50 Mbytes per 1M triangles as the average triangle size is reduced to Less than 10 pixels.

Re claims 9, 14, 22, 29, and 36, Zhu discloses weighting the values as a function of the respective offsets and combining the weighted values (figs. 19-20). Zhu teaches the blending engine combines colors of all sub samples under multi-sample z-buffer anti-aliasing using a standard box filter to generate a final color for each pixel. Under fragment A-buffer anti-aliasing, it combines colors at all fragments at a pixel in either front-to-back or back-to-front order weighted by actual fragment coverage.

Re claims 10, 18, 24, and 33, the Limitation of claims 10, 18, 24, and 33 are identical to claim 1 above. Therefore, claims 10, 18, 24, and 33 are treated with respect to grounds as set forth for claim 1 above.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Javid A Amini whose telephone number is 703-605-4248. The examiner can normally be reached on 8-4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Razavi can be reached on 703-305-4713. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Javid A Amini
Examiner
Art Unit 2672

Javid Amini

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